APPENDIX F
COARSE WOODY DEBRIS, SNAG, AND GREEN TREE RETENTION GUIDELINES

COARSE WOODY DEBRIS

The recommendations in Table F-1 are based on the work of Graham et al., 1994, and Harvey et al., 1987. These guidelines assume that the more severe a disturbance affecting existing soil wood reserves, the more important it becomes to supplement the soil wood supply. Therefore, the recommendations change not only with habitat type, but also with severity of harvest treatment. Coarse woody debris includes material larger than 3 inches diameter, and distribution should be more or less scattered through the unit, with some localized concentrations acceptable, or even desirable for additional wildlife benefits. Low harvest severity is < 30 percent canopy removal, moderate is 30-<70 percent removal, and high is >=70 percent removal.

Table F-1: Recommended Coarse Woody Debris Prescriptions

Harvest or Fire Severity	Habitat Type Groups 1 and 2 Tons/Acre	Habitat Type Groups 3, 9, 10	Habitat Type Groups 4, 7, 8
Low: Low fire severity or harvest leaving slash onsite, no dozer piling or hot broadcast burn	5-10	10-15	15-20
Moderate: Moderate fire severity or harvest with moderate broadcast burn	10-15	15-20	20-25
High: High fire severity, or harvest yarding tops or hot broadcast burn, or dozer pile	15-20	20-25	25-30

SNAGS

The recommendations for snag and green tree retention are derived from the Northern Region snag management protocol (USDA FS, 2000). They are transposed from the VRU clusters used in that document to the habitat type groups (Applegate et al., 1995) and VRUs (USDA FS, 1998) used on the Nez Perce Forest. The data were taken from FIA plots, and modified with consideration for effects of fire suppression and exotic pathogens.

Snag occurrence is highly variable in the landscape, and densities of desirable snags have been highly reduced in the analysis area due to logging and fire suppression (USDA FS, 2003a). Snags provide both wildlife habitat and are recruited to coarse woody debris that sustains soil resources, so measures to improve both retention of adequate numbers and some measure of equitable distribution are justified. This means, particularly for areas that have lost desirable snags to the degree that the Red Pines area has, that snag retention and recruitment should be applied using the guidelines in Table F-2 on all stands where it is possible to do so.

Table F-2: Snag Retention Guidelines

Habitat Type Group/VRU	Snags 11.0-19.9 inches dbh per acre*	Snags >= 20.0 inches dbh per acre*	Total trees per acre	Total trees per 10 acres
Warm dry ponderosa pine and Douglas fir (HTG 1)		1-2	1-2	10-20
Cool Douglas-fir and warm grand fir (HTGs 2, 3, and 4/VRUs 3 and 4 – not lodgepole cover types)		4	4	40
Cool, wet and dry grand fir and subalpine fir (HTGs 3, 4, 7, 9 Not lodgepole cover types or VRU 3 or 4)	4-10	2	6-12	60-120
Cool, wet and dry grand fir and subalpine fir (HTGs 3, 4, 7, 9 - Lodgepole cover types, any VRU)	3-8	2-4 or as available	5-10	50-100
Low elevation cedar (HTGs 5, 6)	8	4	12	120
High elevation cold habitat types (HTGs 10,11)	All available	All available	All available	All available > 10 inches

*Where snags are not available in these classes, substitute green trees. Where neither green trees nor snags are available in these size classes, substitute the largest diameters available. Preferred species in order are ponderosa pine, larch, Douglas fir, grand fir, lodgepole pine, spruce.

GREEN TREE SNAG REPLACEMENT

Protecting existing large diameter snags will not assure long-term snag occurrence on National Forest lands. Managing live trees for long-term snag recruitment is as important as protecting existing snags (Thomas et al., 1979, Hichcox, 1996). Current Nez Perce Forest Plan green tree replacement standards call for 4 trees per acre to be retained to provide large old trees to become snags in the future. Monitoring has shown these trees are likely to be lost to other causes before becoming available as snags. Causes of loss include wind throw, salvage, falling for safety concerns, or slash burning (Steve Blair, personal communication.). Therefore, the recommendations are greater than the Forest Plan's.

The Regional Protocol recommends using SnagPop, a matrix model of tree survivorship and fall rates. This requires site-specific data lacking for many project areas. The recommendations below consider the work of Schommer et al. 1993, and Ritter and Davis, 1994, and the snag guidelines from the Payette National Forest (USDA Forest Service 1995). They are adapted to the same habitat type groups/VRU groups as in the snag recommendations above. They must be considered provisional and need more rigorous modeling and monitoring to evaluate their adequacy.

Densities of desirable replacement large green trees have been highly reduced in the analysis area due to logging (USDA FS, 2003a). Many harvest units have been clearcut and dozer piled so that no recruitable snags, green trees, or woody debris exist. One purpose of these guidelines

is to assure that some green trees are available for snag and down wood recruitment in the future.

Leave trees should represent the range of species and size classes most likely to survive natural fire disturbance, and be located in the clustering patterns and locations most likely to have survived natural fires in the local setting (e.g. open ridges or rocky areas), and be likely to survive harvesting operations and post-harvest exposure.

The rationale for this guide may be less than the 4-6 green tree replacements per snag recommended by Ritter and Davis (1994) for the Clearwater, because the snag recommendations of the Regional Protocols presented in Table F-3 significantly exceed those recommended in the Clearwater guidelines. The recommendations here are based on:

1) An equivalent number of large green retention trees as snags
2) Recommendations for smaller diameter green trees are estimated as twice the number of smaller diameter snags, or twice the numbers of larger snags if no small snags were recommended. This is to provide for variable growth, mortality, and soil wood recruitment over time. These numbers should be more rigorously evaluated before widespread adoption.

Table F-3: Green Tree Snag-Replacement Guidelines

Cover Type	Trees/Acre 11-19.9 in. dbh	Trees/Acre >= 20 inches dbh	Total green trees/Acre	Total Trees/ 10 Acres
Warm dry ponderosa pine and Douglas fir (HTG 1)	4	2	6	60
Grand fir and Cool Douglas fir (HTG 2, 3, 4/VRUs 3 and 4, - not lodgepole cover types)	8	4	12	120
Cool, wet and dry grand fir and subalpine fir, other VRUs (HTGs 3, 4, 7, 8, 9 – not lodgepole pine cover types or VRUs 3 or 4)	14	2	15	150
Low elevation cedar (HTGs 5, 6)	16	4	16	160
Cool, wet and dry grand fir and subalpine fir (HTG 3, 4, 7, 9 - Lodgepole cover types, any VRUs)	12	3 or as available	15	150
High elevation cold habitat types (HTGs 10,11)	Inadequate data	Inadequate data	Inadequate data	Inadequate data

SCALE AT WHICH TO APPLY SNAG AND SNAG RECRUITMENT PRESCRIPTIONS

Snag retention and recruitment prescriptions should be applied, where possible, at the stand scale. Success of snag retention and recruitment may be monitored at the subwatershed scale or larger.

Clumping of snags and retention green trees is acceptable and even desirable for wildlife, in 1-2 acre patches within the unit, where necessary to provide for safety, operability, and long-term retention of leave trees. At the same time, try to ensure that each 3-4 acres is not without a snag.

Green tree replacements and snags in clumps are desirable for nesting birds (Raphael and Morrison, 1984).

Look for natural clumps of snags or for areas where snags and green trees can be most logically maintained through logging and slash treatments.

OPERATIONAL CONSIDERATIONS IN SNAG AND GREEN TREE RETENTION

Not all snags are a grave significant danger and not all snags are of such high value that they should be retained where any safety risk is identified. The decision to cut or leave a snag will be made by the purchaser/operator, using the guide "Risk assessment for identifying reserve trees" that is available from each sale administrator.

Machine harvesting systems with cabs provide more safety than where fallers are exposed to falling trees, so more leeway for leaving trees should be possible where mechanized harvesting and piling are used.

In marking leave trees, attempt to avoid likely landing sites, roads, cable corridors, and within 1.5 tree lengths of the outer unit boundary on broadcast burn units. Snags and green trees will be lost.

Do not mark snags for retention within 300 feet of a road that will be open for firewood cutting unless they can be protected or unless they will not count toward the retention requirement.

Where one particularly desirable and safe snag or green tree is left in isolation on tractor units being machine piled, it should be feasible and economical to retain 20-50 feet of some brush and a few small saplings or poles around this tree to mitigate its isolation. This may not be feasible in broadcast burn units.